

I. IDENTIFICATION DATA

Thesis title:	Epidemiological Modeling and Control
Author's name:	Harun Zalihic
Type of thesis:	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Control Engineering, (13135)
Thesis reviewer:	Kristian Hengster-Movric
Reviewer's department:	Department of Control Engineering, (13135)

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>How demanding was the assigned project?</i>	
Assigned project required familiarity with <i>compartmental systems</i> , epidemiological modeling and analysis methods. Those fields are fairly well explored and described in available literature. Numerical simulations required standard familiarity with MATLAB, Simulink.	

Fulfilment of assignment	fulfilled
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
The student adequately fulfilled the assigned tasks. All set primary goals have been achieved. Following the study of batch and networked compartmental models, including possible non-pharmacological and pharmacological interventions, (<i>i.e.</i> , contact restrictions, quarantine and isolation and vaccination models, respectively), the thesis focuses specifically on models developed for CoViD-19 and assesses the efficacy of the proposed control methods. Thesis also addresses the robustness of the models used, in light of incomplete information and imperfect effect of the measures taken.	

Activity and independence when creating final thesis	A - excellent.
<i>Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared for the consultations. Assess the student's ability to work independently.</i>	
The student worked on the thesis regularly. Weekly meetings took place during this whole period, for which the student was well prepared each time. Progress was steady and clearly seen. The student independently worked on the models, analysis and numerical simulations presented in the thesis.	

Technical level	A - excellent.
<i>Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?</i>	
The thesis presents technically sound results. The student successfully used his wider background in Systems and Control to employ a special set of methods and results particularly pertaining to compartmental systems modelling epidemics. The work is clearly explained and commented.	

Formal level and language level, scope of thesis	B - very good.
<i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	
The employed formalisms and notation are used properly throughout the thesis. The thesis is organized in a clear and logical way. The exposition is satisfactory and the thesis is well-presented. The language is generally understandable, although there are a few rather minor issues with some sentences. The level of English could be somewhat improved upon.	

Selection of sources, citation correctness**A - excellent.**

Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?

The thesis makes adequate references to the existing literature and the reference list is up-to-date. The selection of sources was adequate and the reference list meets the bibliographic standards. Student's own original work and conclusions are clearly distinguished from existing results.

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

The topic of the thesis is certainly current, fitting into the present trend of increased interest in epidemiological models and their control, following the start of the CoViD-19 pandemic, in a hope of informing the public health decision makers. Moreover, the thesis sets its topic in a broader historic context, spanning centuries of scientific interest in epidemics. Thesis focused on a few relatively simple models which were analyzed and numerically simulated with reference to the actual conditions taking place during the still ongoing pandemic. Although relatively simple, these models offer qualitatively interesting results, providing insights into the efficacy of different public health measures undertaken during the CoViD-19 pandemic in Italy and Czech Republic. The student used novel analysis methods specific to compartmental systems to conduct qualitative analysis of the investigated dynamics. Extensive numerical analysis was also undertaken. If the available time period were longer, a more thorough and systematic study could have been done along these lines.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

Summarize your opinion on the thesis and explain your final grading.

During his work on the thesis, the student showed he can independently investigate and analyze compartmental models of mathematical epidemiology and assess the various possibilities of controlling this class of systems, thereby employing appropriate advanced methods of qualitative analysis. The methods showcased in the thesis and the conclusions obtained are interesting and useful in the current situation of the still ongoing CoViD-19 pandemic. For these reasons I would suggest the grade A be awarded.

The grade that I award for the thesis is **A - excellent**.

Date: **31.5.2022**

Signature: